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EXAMINER	
SIANGCHIN, KEVIN	
ART UNIT	**PAPER NUMBER**
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/681,108	DANCE, CHRISTOPHER R.
	Examiner	**Art Unit**
	Kevin Siangchin	2623

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-20 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-20 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 01/10/2001 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Detailed Action

Preface

1. The first and second equations listed in column 4 of Kirk (U.S. Patent 4803548) will be referred to, respectively, as eq.1 and eq.2 in this document.

2. Luminance will be referred to interchangeably with the green color channel in the remainder of this document. Chrominance will be taken to mean a red or blue color channel. This is consistent with Adams' convention (see page 146, section 3.4 of "Interactions Between Color Plane Interpolation and Other Image Processing Functions in Electronic Photography")

Drawings

3. The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on January 10, 2001 have been approved. A proper drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.

4. The Patent and Trademark Office no longer makes drawing changes. See 1017 O.G. 4. It is applicant's responsibility to ensure that the drawings are corrected. Corrections must be made in accordance with the instructions below.

INFORMATION ON HOW TO EFFECT DRAWING CHANGES

Replacement Drawing Sheets.

5. Drawing changes must be made by presenting replacement figures which incorporate the desired changes and which comply with 37 CFR 1.84. An explanation of the changes made must be presented either in the drawing amendments, or remarks, section of the amendment. Any replacement drawing sheet must be identified in the top margin as "Replacement Sheet" and include all of the figures appearing on the immediate prior version of the sheet, even though only one figure may be amended. The figure or figure

number of the amended drawing(s) must not be labeled as "amended." If the changes to the drawing figure(s) are not accepted by the examiner, applicant will be notified of any required corrective action in the next Office action. No further drawing submission will be required, unless applicant is notified.

6. Identifying indicia, if provided, should include the title of the invention, inventor's name, and application number, or docket number (if any) if an application number has not been assigned to the application. If this information is provided, it must be placed on the front of each sheet and centered within the top margin.

Annotated Drawing Sheets.

7. A marked-up copy of any amended drawing figure, including annotations indicating the changes made, may be submitted or required by the examiner. The annotated drawing sheets must be clearly labeled as "Annotated Marked-up Drawings" and accompany the replacement sheets.

Timing of Corrections.

8. Applicant is required to submit acceptable corrected drawings within the time period set in the Office action. See 37 CFR 1.85(a). Failure to take corrective action within the set period will result in ABANDONMENT of the application.

9. If corrected drawings are required in a Notice of Allowability (PTOL-37), the new drawings MUST be filed within the THREE MONTH shortened statutory period set for reply in the "Notice of Allowability." Extensions of time may NOT be obtained under the provisions of 37 CFR 1.136 for filing the corrected drawings after the mailing of a Notice of Allowability.

Claims

Objections

10. Claims 4, 6, and 14 are objected to because of the following informalities. This passage was taken from claim 4:

> ...computes the coefficients a_C and b'_C using the following equations, in which μ_C is the mean and σ^2_C is the variance of green and red color channels C, respectively...

Phrased as such, it can be interpreted from claim 4 that the green color channel and the red channel both have a mean of μ_C and a variance of σ_C, though it is clear from other portions of the applicant's disclosure that μ_C and σ_C are the mean and variance, respectively, of a color channel C, where C = R, G, or B, corresponding to red, green, or blue color channels, respectively. The correspondence between the red, green, and blue color channels and the subscripts of the various variables and parameters found in the subsequent equations of claim 4 should be explicitly defined. Claim 14 is similarly objected to. Appropriate correction is required.

11. Claim 6 recites the following:

> The apparatus according to claim 5, wherein the set sums of color channels comprises a pair of sets of sums of color channels.

It is clear from the preceding claims that the applicant is referring to *the set of sums of color channels* as opposed to *the set sums of color channel*. The potential for the misinterpretation of claim 6 should be obvious. Claim 16 is similarly objected to. Appropriate correction is required.

<u>Rejections Under U.S.C. § 112(2)</u>

12. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

13. Claims 4 and 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. There is no mention of a blue color channel in claims 4 and 14. Specifically, it is not suggested in claims 4 and 14 that C can correspond also to a blue color channel. It is, therefore, unclear as to what color channel the variables and parameters, a_b, b'_b, σ_B, and μ_B correspond to. The computation of the regression coefficients a and b′ for the blue color channel – a computation essential to the applicant's claimed invention – is therefore absent from the claims.

<u>Rejections Under U.S.C. § 102(b)</u>

14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

15. Claims 1-2 and 11-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Adams ("Interactions Between Color plane Interpolation and Other Image Processing Functions in Electronic Photography").

16. *The following is in regard to claim 1.* As discussed by Adams, electronic cameras using a single CCD detector, employing a color filter array (CFA), capture (i.e. samples) three color planes of color information. Such systems (e.g. single sensor Bayer CFA system – see Adams page 144, Section 1.2) produce images such that each image pixel contains information about only one of three spectral bands. These images are subsequently interpolated to reconstruct the image to have three full-resolution color planes. See page 144 of Adams. In this regard, such electronic cameras provide an "apparatus for reconstructing color filter array images, comprising: an image recording module for generating an image of sampled values output from a color filter array; each pixel in the image having a location at which a sampled value of one of a plurality of color channels is recorded", in accordance with claim 1.

17. Adams discusses several interpolation techniques used in the reconstruction of the three full-resolution color planes. See, for example, section 3.4 and figure 9 on pages 146-147. Notice that interpolation equations (9)-(11) provide a set of linear transformations from the sampled value at the location of a selected pixel in the image to an estimate of a color channel not recorded by the single-sensor CFA system (i.e. the image recoding module) at the location of the selected pixel in the image. Consider, for instance, equation (9). Equation (9) can be shown to satisfy the mathematical definition of a linear transformation from the sampled value, G2, to the estimate of the color channel not recorded, i.e. B2. Clearly, this is in accordance with the "image reconstruction module" of claim 1. Thus, Adams teaches all aspects of claim 1.

18. *The following is in regard to claim 2.* Again, referring to equations (9)-(10) of Adams, notice that the coefficients of the aforementioned linear transformations are computed. For example, equation (9) can be expressed as $B2 = cG2$, where $c=\frac{1}{2}(B1/G1 + B3/G3)$ can be considered the coefficient of the linear transformation from G2 to B2. In this regard, Adams teaches all aspects of claim 2.

19. *The following is in regard to claims 11 and 12.* Note that claims 11 and 12 merely claim the method that is implemented by the apparatus of claims 1 and 2, respectively. Therefore, with regard to claims 11 and 12, arguments analogous to those presented for 1 and 2 are applicable. See the appropriate paragraphs above.

Rejections Under U.S.C. § 103(a)

20. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

21. Claims 3, 5-10, 13, and 15-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adams, in view of Kirk (U.S. Patent 4803548).

22. *The following is in regard to claim 3.* As shown above, Adams discloses an apparatus in accordance with claims 1 and 2. Adams does not, however, disclose an apparatus in accordance with claim 2, wherein the coefficients of the linear transformation are computed by computing statistics that depend on the sampled value but not the position of the samples of at least two color channels within a window of the image.

23. Kirk discloses a method and apparatus of enhancing a video image defined by luminance and chrominance information, where for a region of predetermined size (i.e. a window), selected among the multitude of such regions composing the video image, the following is done:

i. determining a statistical relationship between the luminance information and the chromaticity information for the selected region; and,

ii. generating modified chromaticity information for at least a portion of the selected region by applying the determined statistical relationship to the luminance information for the said portion.

See Kirk, "Summary of Invention", paragraphs 1-3. Preferably, (i) comprises carrying out a regression analysis to generate a relationship between the luminance (L) and a chrominance coordinate (I) of the form,

$I = C_0 + \Sigma C_n F_n(L) + \ldots$, where F_n is a general function series, such as a power series of L. The intention of this analysis is to determine values for the constants C_0, C_1, etc. Preferably, a linear relationship (see the equations in column 4 of Kirk) is determined between luminance and chromaticity leading to the generation of just two regression coefficients for each chromatic signal. See Kirk, column 2, lines 25-39 and column 4, lines 4-45. It is clear that the above relationship between L and I is dependent on the *values* of the chromaticity I and luminance L and not the spatial location of the corresponding pixel within the given image. It should thus be evident from the preceding discussion that Kirk teaches the computation of the linear transformation coefficients in a manner similar, if not identical, to that of claim 3.

24. Clearly, using regression analysis, in the manner proposed by Kirk, simply provides an alternative mathematical device to the interpolation technique, discussed above, for the derivation of a linear relationship and/or transformation from one color channel to another. The applicability of Kirk's method and apparatus to the reconstruction of CFA images stems from the fact that it provides a means to generate a high or full-resolution set of estimated color information (e.g. a full-resolution color plane) from a low resolution or incomplete set of color information (e.g. the incomplete color planes of the CFA image). It would, therefore, be straightforward for one of ordinary skill in the art to replace the interpolation scheme taught by Adams with the regression analysis of Kirk's invention.

25. In general, the effectiveness of an interpolation technique is a function of the spatial resolution of the set of known points. The effectiveness of interpolation, therefore, degrades when sets of color information (e.g. a sampled color plane) are sparse. Thus, the quality or effectiveness of a CFA image reconstruction method or apparatus becomes directly related to the spatial resolution of the CFA image, which, in turn, is related to the density of costly CCD sensors. This is suggested in the "Description of the Prior Art" of Kirk. Clearly, a method or apparatus that provided a means for deriving an estimated relation between color channels, whereby a reconstructed CFA image can be obtained, and is further independent of the spatial resolution of the sampled CFA image, is desirable. Given that the relation derived by the method and apparatus of Kirk is not spatially dependent, one would expect that it would be less prone to the degradation exhibited by interpolation techniques, and hence less sensitive to the spatial resolution of the sampled CFA image. Given this advantage over interpolation techniques of Adams and the apparent

interchangeability of those techniques and the regression analysis of Kirk, it would have been obvious to one of ordinary skill in the art, at the time of the applicant's claimed invention, to replace the interpolation techniques taught by Adams with the regression analysis and items (i) and (ii) above, to perform CFA image reconstruction in a manner similar to claim 3.

26. *The following is in regard to claim 5*. The regression analysis shown in Kirk defines a linear relation between the sets of luminance averages ($\bar{L}$) and sets of chromaticity averages, $\bar{I}$ and $\bar{Q}$, respectively. These relations are given by the equations in column 4 of Kirk. See also Kirk, column 3, lines 15-30, column 4, lines 4-45, and Fig. 2. It can be seen from these equations that a line is fit to the set of $\bar{L}$ and the set of $\bar{I}$, in eq.1, and a line is fit to the set of $\bar{L}$ and the set of $\bar{Q}$, in eq.2. The regression analysis of Kirk (i.e. the line fitting) attempts to derive the regression coefficients, C_{0I}, C_{1I}, C_{0Q}, and C_{1Q} of the said equations. Each element of the aforementioned sets of averages corresponds to one of the multitude of 4×4 regions composing the image. These regions are analogous to the windows of claim 5. Furthermore, since averages are weighted sums, the aforementioned sets of averages can each be reasonably considered sets of sums of color channels. In computing the averages, such as $\bar{L}$, $\bar{I}$, and $\bar{Q}$ for each of the said regions, color channel information (e.g. *L*, *I*, or *Q*) is typically accumulated sequentially along lines through the region (e.g. along rows or along columns). Therefore, the image reconstruction module, obtained by combining the teachings of Adams with those of Kirk, in the manner described above, computes the regression coefficients, C_{0I} and C_{1I}, by fitting a line to a set of weighted sums along lines through a window (i.e. the set of $\bar{L}$) and another set of weighted sums along lines through the same window (i.e. the set of $\bar{I}$); and computes the regression coefficients, C_{0Q}, and C_{1Q}, by fitting a line to a set of weighted sums along lines through a window (i.e. the set of $\bar{L}$) and another set of weighted sums along lines through the same window (i.e. the set of $\bar{Q}$). This is in accordance with claim 5.

27. *The following is in regard to claim 6*. Observe from the preceding discussion that, in the computation of, say, C_{0I} and C_{1I}, the union of the set of $\bar{L}$ and the set of $\bar{I}$ form a set of sums of color channels comprising a pair of sets of sums of color channels. Therefore, the teachings of Adams and Kirk, when combined in the manner described above, address all aspects of claim 6.

28. *The following is in regard to claim 7.* Kirk suggests using the least squares fitting technique to fit lines (defined by eq.1 and eq.2) to the respective chromaticity values and the luminance values. See Kirk, column 3, lines 22-29. In this manner, the teachings of Adams and Kirk, when combined as described above, address the limitations of claim 7.

29. *The following is in regard to claim 8 and 18.* According to Kirk, after deriving the linear functions defined by eq.1 and eq.2, a determination is made as to whether the said functions fit the corresponding L, I data well for the region. Kirk achieves this by obtaining the sum of the squares of the differences between each data point and the respective function and comparing with a predetermined threshold. See Kirk column 4, lines 32-44. This addresses the claimed subject matter of claim 8 in the following way. First, the sum of the squares of the differences (for the sake of brevity, this sum will be referred to here as Σ_D), just mentioned, provides a quantitative measure of the goodness-of-fit of the derived linear functions with the corresponding L or I data of the given region, or conversely, a quantitative measure of the goodness-of-fit of the L or I data of the given region with the corresponding linear function. Σ_D can be considered a *confidence measure*, in the same vein as that of the applicant's disclosure, because it and the applicant's confidence measure (e.g. Q on page 8 of the applicant's disclosure) both provide a goodness-of-fit measure which is later used to restrict outlying or potentially outlying color channel data. Furthermore, Kirk only constrains the regions to be of the same size and square or rectangular (Kirk, column 3, lines 14-15). Thus, the regions may be chosen such that each forms a row or column. In such a case, Σ_D would be calculated per row or column. Lastly, Σ_D for a given row or column is directly related to the sum of the color channels for that row or column. Intuitively, Σ_D has the form, $\sum(\chi_i - \hat{\chi}_i)^2$, where χ_i is a color channel datum (I or Q) along the given row or column and $\hat{\chi}_i$ is the corresponding color channel datum estimated by the derived regression model. It can be shown by expanding this expression that Σ_D is further related to the squared difference, $(\sum_{i=1}^{N}\chi_i - \sum_{i=1}^{N}\hat{\chi}_i)^2$ where, $\Sigma\,\chi_i$, is the sum of the given row or column of color channel data and $\Sigma\,\hat{\chi}_i$, is the sum of the given row or column of estimated color channel data. This squared difference can, in turn, provide a confidence measure of the sum of the given row or column of color channel data, $\Sigma\,\chi_i$. Thus, Σ_D implicitly provides a confidence measure of the sum of the given row or

column of color channel data. Taking all of this into account, it is clear that Kirk teaches (albeit implicitly) the determination of *one of a* confidence and a variance measure (i.e. a confidence measure) for the sums of a row or column of color channel data. Therefore, the teachings of Adams and Kirk, when combined in the manner described above, address the limitations of claim 8. This same line of reasoning can be applied to the rejection of claim 18.

30. *The following is in regard to claims 9 and 10.* As mentioned above, the averages, $\bar{L}$, $\bar{I}$, and $\bar{Q}$ are computed for each of the regions composing the given image. Again, averages are weighted sums. These weighted sums are typically computed sequentially – either along rows or columns of the region of interest. Thus, the teachings of Adams and Kirk, when combined in the manner described above, address the limitations of claims 9 and 10.

31. *The following is in regard to claims 13, 15-17, and 19-20.* Note that claims 13, 15-17, and 19-20 merely claim the method that is implemented by the apparatus of claims 3, 5-7, and 9-10, respectively.

32. With regard to claim 13, arguments analogous to those presented for 3 are applicable. See the appropriate paragraphs above.

33. With regard to claim 15, arguments analogous to those presented for 5 are applicable. See the appropriate paragraphs above.

34. With regard to claim 16, arguments analogous to those presented for 6 are applicable. See the appropriate paragraphs above.

35. With regard to claim 17, arguments analogous to those presented for 7 are applicable. See the appropriate paragraphs above.

36. With regard to claim 19-20, arguments analogous to those presented for 9-10 are applicable. See the appropriate paragraphs above.

37. Claims 4 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adams, in view of Kirk, in further view of Weisstein ("CRC Concise Encyclopedia of Mathematics", 1999).

38. *The following is in regard to claim 4.* As mentioned above, in Kirk's invention, a linear relationship is determined, via linear regression, between luminance and chromaticity leading to the generation of just two regression coefficients for each chromatic signal. See the equations in column 4 of

Kirk. Furthermore, Kirk suggests the usage of "least squares" (Kirk, column 3, lines 27-29) to derive a linear relation between each of the chromaticity signals and the luminance signal. Least squares is a well-known method of linear regression. Although not explicitly given in Kirk, the formulas for the regression coefficients, C_{0I}, C_{1I}, C_{0Q}, and C_{1Q}, of eq.1 and eq.2 can assume the standard expressions, in terms of the corresponding means and variances, given by the least squares method. These are shown in equations (40) and (41) on page 1047 of Weisstein. Accordingly,

$$C_{1\chi} = \frac{\text{cov}(\overline{\chi},\overline{L})}{\sigma^2_{\overline{\chi}}} \qquad (32.1)$$

$$C_{0\chi} = \mu_{\overline{L}} - C_{1\chi}\mu_{\overline{\chi}} \qquad (32.2)$$

where $\chi = \text{I}$ for eq.1 and $\chi = \text{Q}$ for eq.2, and $\mu_{\overline{L}}$ and $\mu_{\overline{\chi}}$ are the means of $\overline{L}$ and $\overline{\chi}$, respectively. Note that (32.1) can be expressed as

$$C_{1\chi} = \rho_{\chi L}\frac{\sigma_{\overline{L}}}{\sigma_{\overline{\chi}}} = \rho_{\chi L}\sqrt{\frac{\sigma^2_{\overline{L}}}{\sigma^2_{\overline{\chi}}}} \qquad (32.3)$$

where $\rho_{\chi L} \in [-1,1]$ is the correlation coefficient of $\overline{\chi}$ and $\overline{L}$. Further note that for linearly related random variables $\overline{\chi}$ and $\overline{L}$, $\rho_{\chi L} = \pm 1$. From Kirk (see Fig. 2) one can infer that the relation between $\overline{\chi}$ and $\overline{L}$ is such that $\rho_{\chi L} = 1$, in which case,

$$C_{1\chi} = \sqrt{\frac{\sigma^2_{\overline{L}}}{\sigma^2_{\overline{\chi}}}} \qquad (32.4)$$

It should then be clear from (32.2) and (321.4) that $C_{0\chi}$ and $C_{1\chi}$ (χ = I, Q) of eq.1 and eq.2 of Kirk, when obtained by least squares linear regression, are of identical form to the coefficients a_C and b_C' (C = R, B) of claim 4. In particular, since the luminance ($\overline{L}$) corresponds to the green color channel (G) and the chrominance ($\overline{\chi}$) corresponds to the red and blue color channels (C = R, B) (see Adams, page 146, Section 3.4), the equations above are of identical form to those of claim 4, both mathematically and in terms of their purpose with respect to a CFA image reconstruction apparatus, obtained either via the combined teachings of Adams and Kirk or as claimed by the applicant.

32. The usage of least squares to derive a linear relation between each of the chrominance components and the luminance would be natural for one of ordinary skill in the art, since it is the simplest and most commonly applied form of linear regression (Weisstein, page 1045, paragraph 3). Given this and relative ease with which it can be incorporated into an image reconstruction apparatus (Kirk's invention already accommodates linear regression), it would have been obvious to one of ordinary skill in the art, at the time of the applicant's claimed invention, to incorporate the teaching of Weisstein, with regard to least squares fitting, into a system obtained by combining the teachings of Adams and Kirk, in the manner detailed above. By doing so, one would obtain CFA image reconstruction apparatus having an image reconstruction module that computes the coefficients, of identical form and purpose to those of claim 4.

33. *The following is in regard to claims 14.* Note that claim 14 merely claims the method that is implemented by the apparatus of claims 4. Therefore, with regard to claim 14, arguments analogous to those presented for 4 are applicable. See the appropriate paragraphs above.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Siangchin whose telephone number is (703)308-6604. The examiner can normally be reached on 9:00am - 5:30pm, Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (703)308-6604. The fax phone number for the organization where this application or proceeding is assigned is (703)972-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)306-0377.

Kevin Siangchin
Examiner
Art Unit 2623

ks – 12/05/03

Jon Chang

Jon Chang
Primary Examiner